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Serial No **08 / 477 703**
Filed June 7 1995
Group Art Unit 3747
Examiner Noah Kamen
New Title FLUID TRANSFER IN RECIPROCATING DEVICES

4th April 2007

RESPONSE TO OFFICE COMMUNICATION - CORRECTIONS

This response to the Office Communication mailed 5th March 2007 is respectfully submitted.

The applicant's mailing of 12th February contained three errors, including the numbering of claims referred to in the Office Communication:

- 1 *The title page of the clean copy of the text as amended that date had the wrong date. A corrected title page is herewith enclosed, the only page to be substituted in the 109 page text submitted this February.*
- 2 *In both the complete annotated and clean claims, claims 203 and 204 were repeated, so that the same two identical claims were listed twice. In the complete annotated and clean claims submitted herewith, the second listings of claims 203 and 204 are deleted.*
- 3 *Dependent claim 332 referred to the wrong main claim number. This correction is included in the Supplemental Amendment below.*

Please note that this mailing includes a supplemental amendment to the claims, and both the corrections described above and the amendments to claims are incorporated in the annotated and clean schedules of claims submitted herewith.

SUPPLEMENTAL AMENDMENT

IN THE CLAIMS

Please Amend main claim 221 to recite "at least one head portion", as indicated in the attached annotated schedule of all claims.

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Please amend claims 208, 231, 257, 286, 308 and 332 to refer to a "reciprocating" IC engine include a recital of "said engine having a charge gas supply system, a fuel delivery apparatus and an emission control system for hot exhaust gas emitted from said engine when operative", as indicated in the attached annotated schedule of all claims.

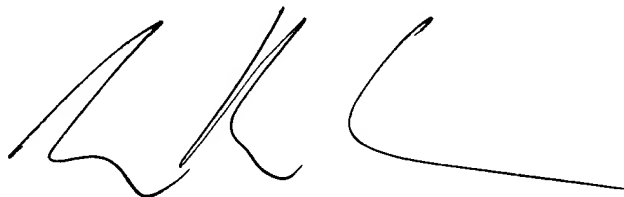
Please make claim 332 dependent on main claim 321, as indicated in the attached annotated schedule of all claims.

Please amend independent claim 349 to describe "an emission control system for hot exhaust gas emitted from said engine when operative", as indicated in the attached annotated schedule of all claims.

Please add two new multiple dependent claims 358 and 359, as indicated in the attached annotated schedule of all claims.

A clean version of all claims in the case, as corrected, amended and added to herein, is additionally attached.

Sincerely,

A handwritten signature in black ink, consisting of stylized, overlapping loops and a long horizontal stroke at the end.

Mitja Victor Hinderks.

Sole inventor, applicant and power-of-attorney of record.



TITLE:

FLUID TRANSFER IN RECIPROCATING DEVICES

INVENTOR:

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APPLICATION:

08 / 477 703 filed June 7 1995 Group Art 3747 Examiner N Kamen
(Clean Text as per Supplemental Amendment filed 12th February 2007)

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a

| | | | | |
|------------|-------------------------|--------------|-----------------|----------------|
| | Divisional of | 08 / 441 117 | 15 May 95, | now abandoned, |
| which is a | Continuation of | 08 / 287 429 | 9 August 94, | now abandoned, |
| which is a | Continuation of | 08 / 136 729 | 14 October 93, | now abandoned, |
| which is a | Continuation of | 07 / 982 424 | 27 November 92, | now abandoned, |
| which is a | Continuation of | 07 / 543 405 | 26 June 90, | now abandoned, |
| which is a | Continuation-in-part of | 07 / 237 761 | 29 August 88, | now abandoned, |
| which is a | Continuation-in-part of | 06 / 928 659 | 5 November 86, | now abandoned, |
| which is a | Continuation of | 06 / 804 332 | 5 December 85, | now abandoned, |
| which is a | Continuation of | 06 / 407 823 | 13 August 82, | now abandoned, |
| which is a | Continuation-in-part of | 05 / 737 099 | 29 October 76, | now abandoned, |
| which is a | Continuation of | 05 / 473 797 | 28 May 74, | now abandoned, |
| which is a | Continuation-in-part of | 05 / 270 029 | 10 July 72, | now abandoned, |

Foreign Applications

| | | |
|----------------|-------|-------------|
| United Kingdom | 23485 | 18 May 72 |
| United Kingdom | 21149 | 5 May 72 |
| United Kingdom | 16450 | 10 April 72 |
| United Kingdom | 32228 | 8 July 71 |

TECHNICAL FIELD:

The disclosure relates to combustion engines, pumps, exhaust emissions control devices, as well as their components and ancillary equipment.



RESPONSE 4th April 2007

to Office Communication mailed 5th March 2007

USPTO Application 08 / 477 703 Mitja Hinderks 310 208 6606

ANNOTATED CLAIMS

What is CLAIMED is:

(1 -197) Claims 1 to 197 are cancelled or renumbered, as noted in the Supplemental Amendment of 25th May 2006.

198 (Currently Amended) A device for the working of fluids, said device having (a) an integral housing at least partly supporting and substantially enclosing a cylinder assembly comprising a cylinder with at least one circumferential depression, said assembly containing a component with at least one external circumferential projection, said external circumferential projection reciprocable in said internal circumferential depression and both cylinder and component having working surfaces defining at least one pair of toroidal fluid working chambers which in operation have cyclically variable capacity, said housing including insulating material for the purpose of restricting heat transfer from said assembly.

199 (Original) The device of claim 198, including means to mount said cylinder assembly in said housing to enable said cylinder assembly to rotate while said component is reciprocating in said cylinder assembly.

200 (Original) The device of claim 198, including means between said assembly and said component so as to cause said component to rotate relative to said assembly while reciprocating in said assembly.

201 (Original) The device of claim 198, wherein at least one of said cylinder assembly and said component is at least partly composed of ceramic material.

202 (Original) The device of claim 198, including at least one fastener, wherein said cylinder assembly includes a multiplicity of elements held in assembled condition by said fastener loaded under tension.

- 203 (Original) The device of claim 198, including at least one fastener, said reciprocable component comprising a multiplicity of elements, said elements being held in assembled condition by said fastener loaded in tension.
- 204 (Original) The device of claim 198, wherein said assembly comprises at least one pair of substantially identical components arranged in mirror image about one another.
- 205 (Original) The device of claim 198, wherein said component defines a passage for fluids worked by said device.
- 206 (Currently Amended) The device of claim 198, including cylinder assembly surfaces and component surfaces at least partly defining said working chambers, at least one of said surfaces having at least one relatively small deliberately manufactured depression, said depression wholly fillable by fluids worked by said device.
- 207 (Currently Amended) The device of claim 198, including structure located at least in part outside said cylinder assembly, said structure at least partly defining at least one volume for passage of fluids to or from at least one of said working chambers, (said structure located within said housing and at least partly surrounding at least a portion of said cylinder assembly;) said volume at least partly surrounding portion of (being located substantially between said structure and) said cylinder assembly.
- 208 (Currently Amended) The device of claim 198, wherein said device is part of ~~(an)~~ a reciprocating internal combustion engine and said working chambers are combustion chambers, said engine having a charge gas supply system, a fuel delivery apparatus and an emission control system for hot exhaust gas emitted from said engine when operative.
- 209 (Original) The device of claim 200, wherein said means comprise a guide and an endless track, said guide movable in said endless track, said track having a multiple wave-form configuration.
- 210 (Original) The device of claim 200, wherein said means comprise said component and said cylinder assembly defining complementary surfaces at least partly of an endless wave-like configuration.

- 211 (Original) *The device of claim 200, including a rotatable shaft and a load transfer mechanism between said shaft and said rotatable and reciprocable component, wherein said mechanism comprises a hollow shaft with interior splines slidable on a shaft with external splines.*
- 212 (Original) *The device of claim 200, including a rotatable shaft and a load transfer mechanism between said shaft and said component, wherein said mechanism includes a bellows device.*
- 213 (Original) *The device of claim 200, including a rotatable shaft and a load transfer mechanism between said shaft and said component, wherein said mechanism includes at least one hinged element.*
- 214 (Original) *The device of claim 200, including a rotatable shaft and a load transfer mechanism between said shaft and said component, wherein said mechanism includes at least one pair of substantially parallel flanges separated by at least one roller, the flanges in operation moving laterally relatively to one another.*
- 215 (Original) *The device of claim 201, including at least one electrical circuit within said ceramic material.*
- 216 (Original) *The device of claim 202, wherein said fastener is of tubular form.*
- 217 (Original) *The device of claim 203, wherein said fastener is of tubular form.*
- 218 (Original) *The device of claim 204, including at least one port located in said cylinder assembly for passage of fluid to or from said working chambers, wherein said port is positioned between said pair of components.*
- 219 (Original) *The device of claim 207, wherein said structure is at least partly of insulating material for the purpose of restricting heat transfer from said volume.*
- 220 (Currently Amended) *The device of claim 209, wherein said guide is disengagable from said track during operation of said device.*

- 221 (Currently Amended) A device for the working of fluids, said device comprising (α) an integral housing at least partly supporting and substantially enclosing a cylinder assembly (having cylinder and head portions), said assembly having a cylinder portion and at least one cylinder head portion and a component reciprocally movable within said assembly, said head portion and component defining a variable working chamber therebetween, said component having an internal passage for transfer of fluids to or from said working chamber, said chamber being separated from and pierced by said passage, said housing including insulating material for the purpose of restricting heat transfer from said assembly.
- 222 (Original) The device of claim 221, including means to mount said cylinder assembly in said housing to enable said cylinder assembly to rotate while said component is reciprocating in said cylinder assembly.
- 223 (Original) The device of claim 221, including means between said cylinder assembly and said component so as to cause said component to rotate relative to said cylinder while reciprocating in said cylinder assembly.
- 224 (Original) The device of claim 221 ~~[[55]]~~, wherein said cylinder assembly is substantially made of ceramic material.
- 225 (Original) The device of claim 221, wherein said component is at least partly composed of ceramic material.
- 226 (Original) The device of claim 221, including at least one fastener, wherein said cylinder assembly includes a multiplicity of elements held in assembled condition by said at least one fastener loaded under tension.
- 227 (Original) The device of claim 221, including at least one fastener, said reciprocable component comprising a multiplicity of elements, said elements being held in assembled condition by said fastener loaded in tension.
- 228 (Original) The device of claim 221, wherein said assembly comprises at least one pair of substantially identical components arranged in mirror image about one another.
- 229 (Currently Amended) The device of claim 221, including cylinder assembly surfaces and

component surfaces at least partly defining said working chambers, at least one of said surfaces having at least one relatively small deliberately manufactured depression, said depression wholly fillable by fluids worked by said device.

- 230 *(Currently Amended) The device of claim 221, including structure located at least in part outside said cylinder assembly, said structure at least partly defining at least one volume for passage of fluids to or from at least one of said working chambers, (~~said structure located within said housing and at least partly surrounding at least a portion of said cylinder assembly,~~) said volume at least partly surrounding portion of (being located substantially between said structure and) said cylinder assembly.*
- 231 *(Currently Amended) The device of claim 221, wherein said device is part of ~~(an)~~ a reciprocating internal combustion engine and said working chamber is a combustion chamber, said engine having a charge gas supply system, a fuel delivery apparatus and an emission control system for hot exhaust gas emitted from said engine when operative.*
- 232 *(Original) The device of claim 223, wherein said means comprise a guide and an endless track, said guide movable in said endless track, said track having a multiple wave-form configuration.*
- 233 *(Original) The device of claim 223, wherein said means comprise said component and said cylinder assembly define complementary surfaces at least partly of an endless wave-like configuration.*
- 234 *(Original) The device of claim 223, including a rotatable shaft and a load transfer mechanism between said shaft and said rotatable and reciprocable component,, wherein said mechanism comprises a hollow shaft with interior splines slidable on a shaft with external splines.*
- 235 *(Original) The device of claim 224, including at least one electrical circuit within said ceramic material.*
- 236 *(Original) The device of claim 225, including at least one electrical circuit within said ceramic material.*

- 237 (Original) *The device of claim 226, wherein said fastener is of tubular form.*
- 238 (Original) *The device of claim 227, wherein said fastener is of tubular form.*
- 239 (Original) *The device of claim 228, including at least one port located in said cylinder assembly for passage of fluid to or from said working chamber, wherein said port is positioned between said pair of components.*
- 240 (Original) *The device of claim 230, wherein said structure is at least partly of insulating material for the purpose of restricting heat transfer from said volume.*
- 241 (Currently Amended) *The device of claim 232, wherein said guide is disengagable from said track during operation of said device.*
- 242 (Original) *A device for the working of fluids comprising at least one cylinder assembly containing a component reciprocable therein, said component having two longitudinal extremities and at least one circumferential projection, said cylinder assembly having at least one internal circumferential depression in which said projection is positioned to reciprocate, said projection and depression forming a pair of toroidal fluid working chambers of cyclically variable capacity, said component having at least one internal passage for movement of fluids to or from said working chambers, said assembly including a multiplicity of elements of ceramic material held in assembled and abutted condition by at least one fastener loaded in tension.*
- 243 (Original) *The device of claim 242, including a housing in which said cylinder assembly is mounted.*
- 244 (Original) *The device of claim 242, including means between said assembly and said component so as to cause said component to rotate relative to said assembly while reciprocating in said assembly.*
- 245 (Original) *The device of claim 242, including a crankshaft and a connecting rod, to which crankshaft an extremity is linked by said connecting rod.*
- 246 (Original) *The device of claim 242, wherein at least one of said extremities in normal*

operation transfers loads associated with said working chambers, said loads in operation being principally in tension.

- 247 (Original) *The device of claim 242, wherein said component is at least partly composed of ceramic material.*
- 248 (Original) *The device of claim 242, wherein said assembly comprises at least one pair of substantially identical components arranged in mirror image about one another.*
- 249 (Original) *The device of claim 242, including at least one second fastener, said reciprocable component comprising a multiplicity of elements, said elements being held in assembled condition by said second fastener loaded in tension.*
- 250 (Original) *The device of claim 242, including filamentary material contained in said internal passage.*
- 251 (Original) *The device of claim 242, wherein said component has at least one surface at least partly defining said working chambers, said surface having at least one relatively small manufactured depression wholly fillable by fluids worked by said device.*
- 252 (Original) *The device of claim 242, wherein said cylinder assembly has at least one surface at least partly defining said working chambers, said surface having at least one relatively small manufactured depressions wholly fillable by fluids worked by said device.*
- 253 (Original) *The device of claim 242, wherein said fastener is of tubular form.*
- 254 (Original) *The device of claim 242, including at least one electrical circuit within said ceramic material.*
- 255 (Original) *The device of claim 242, including a rotatable shaft and a load transfer mechanism, said component being linked to said rotatable shaft by said load transfer mechanism.*
- 256 (Currently Amended) *The device of claim 242, including structure located at least in part outside said cylinder assembly, said structure at least partly defining at least one volume for*

passage of fluids to or from at least one of said working chambers, (~~said structure located within said housing and at least partly surrounding at least a portion of said cylinder assembly,~~) said volume at least partly surrounding portion of (~~being located substantially between said structure and~~) said cylinder assembly.

257 (Currently Amended) *The device of claim 242, wherein said device is part of (~~an~~) a reciprocating internal combustion engine and said working chambers are combustion chambers, said engine (~~in operation generating hot exhaust gas~~) having a charge gas supply system, a fuel delivery apparatus and an emission control system for hot exhaust gas emitted from said engine when operative.*

258 (Original) *The device of claim 243, wherein said housing is at least partially composed of thermally insulating material.*

259 (Original) *The device of claim 243, including means to mount said cylinder assembly in said housing to enable said cylinder assembly to rotate while said component is reciprocating in said cylinder assembly.*

260 (Original) *The device of claim 244, wherein said means comprise a guide and an endless track, said guide movable in said endless track, said track having a multiple wave form configuration.*

261 (Original) *The device of claim 244, wherein said means comprise said component and said cylinder assembly define complementary surfaces at least partly of endless wave-like configurations.*

262 (Original) *The device of claim 247, including at least one electrical circuit within said ceramic material.*

263 (Original) *The device of claim 248, wherein said pair of components define a port therebetween for passage of fluid to or from said working chambers.*

264 (Original) *The device of claim 249, wherein said second fastener is of tubular form.*

265 (Original) *The device of claim 250, wherein said filamentary material includes substance*

having catalytic effect to hasten chemical reaction in said working fluid.

266 (Original) *The device of claim 255, wherein said mechanism comprises a hollow shaft with interior splines slidable on a shaft with external splines.*

267 (Original) *The device of claim 255, wherein said mechanism comprises a bellows device.*

268 (Original) *The device of claim 255, wherein said mechanism includes at least one hinged element.*

269 (Original) *The device of claim 255, wherein said mechanism includes at least one pair of substantially parallel flanges separated by at least one roller, the flanges in operation moving laterally relatively to one another.*

270 (Original) *The device of claim 256, including filamentary material contained in said volume.*

271 (Original) *The device of claim 257, wherein said device is part of a compound engine including said internal combustion engine and a second engine.*

272 (Original) *The device of claim 260, wherein said guide is disengagable from said track.*

273 (Original) *The device of claim 270, wherein said filamentary material includes substance having catalytic effect to hasten chemical reaction in said working fluid.*

274 (Original) *The device of claim 271, wherein said second engine is a turbine engine, in operation said hot exhaust gas being used to power said turbine engine.*

275 (Original) *The device of claim 271, wherein said second engine is a steam engine, in operation energy from said hot exhaust gas being used to power said steam engine.*

276 (Original) *The device of claim 271, wherein said second engine is a Stirling engine, in operation energy from said hot exhaust gas being used to power said Stirling engine.*

277 (Currently Amended) *A device for the working of fluids comprising (α) an integral structure, a cylinder assembly having at least one circumferential depression and mounted in and at*

least partly surrounded by said structure and containing a component reciprocable in said assembly, said component having two cylindrical ends each with at least one opening and at least one circumferential projection reciprocable in said circumferential depression in said assembly to form at least one pair of toroidal fluid working chambers of cyclically variable capacity, said component having at least one internal passage for transfer of fluids to or from said working chambers, said structure at least partially surrounding portion of said cylinder assembly and including insulating material to restrict heat transfer from said assembly, in operation said openings permitting transfer of fluid between said passage and said working chambers.

- 278 (Original) The device of claim 277, including a housing which substantially encloses said structure and said cylinder assembly.
- 279 (Original) The device of claim 277, including means between said assembly and said component so as to cause said component to rotate relative to said assembly while reciprocating in said assembly.
- 280 (Original) The device of claim 277, wherein at least one of said cylinder assembly and said component is at least partly composed of ceramic material.
- 281 (Original) The device of claim 277, including at least one fastener, wherein said cylinder assembly includes a multiplicity of elements held in assembled condition by said at least one fastener loaded under tension.
- 282 (Original) The device of claim 277, including at least one fastener, said reciprocable component comprising a multiplicity of elements, said elements being held in assembled condition by said fastener loaded in tension.
- 283 (Original) The device of claim 277, wherein said assembly comprises at least one pair of substantially identical components arranged in mirror image about one another.
- 284 (Currently Amended) The device of claim 277, including cylinder assembly surfaces and component surfaces at least partly defining said working chambers, at least one of said surfaces having at least one relatively small deliberately manufactured depression, said depression wholly fillable by fluids worked by said device.

- 285 (Currently Amended) The device of claim 277, including (~~structure defining~~) at least one volume for passage of fluids to or from at least one of said working chambers, (~~said structure located within said housing and at least partly surrounding at least a portion of said cylinder assembly,~~) said volume being located substantially between said structure and said cylinder assembly, said volume at least partly surrounding portion of said cylinder assembly.
- 286 (Currently Amended) The device of claim 277, wherein said device is part of (~~an~~) a reciprocating internal combustion engine and said working chambers are combustion chambers, said engine having a charge gas supply system, a fuel delivery apparatus and an emission control system for hot exhaust gas emitted from said engine when operative.
- 287 (Original) The device of claim 278, including means to mount said cylinder assembly in said housing to enable said cylinder assembly to rotate while said component is reciprocating in said cylinder assembly.
- 288 (Original) The device of claim 278, wherein said housing is at least partially composed of thermally insulating material.
- 289 (Original) The device of claim 279, wherein said means comprise a guide and an endless track, said guide movable in said endless track, said track having a multiple wave form configuration.
- 290 (Original) The device of claim 279, wherein said means comprise said component and said cylinder assembly define complementary surfaces at least partly of endless wave-like configurations.
- 291 (Original) The device of claim 279, including a rotatable shaft and a load transfer mechanism between said shaft and said rotatable and reciprocable component, wherein said mechanism comprises a hollow shaft with interior splines slidable on a shaft with external splines.
- 292 (Original) The device of claim 280, including at least one electrical circuit within said ceramic material.
- 293 (Original) The device of claim 281, wherein said fastener is of tubular form.

- 294 (Original) *The device of claim 282, wherein said fastener is of tubular form.*
- 295 (Original) *The device of claim 283, including at least one port located in said cylinder assembly for passage of fluid to or from said working chambers, wherein said port is positioned between said pair of components.*
- 296 (Currently Amended) *The device of claim 289, wherein said guide is disengagable from said track during operation of said device.*
- 297 (Original) *A device for the working of fluids, said device having a cylinder assembly comprising a cylinder with at least one internal circumferential depression, said assembly containing a component with at least one external circumferential projection, said external circumferential projection reciprocating in said circumferential depression and both having working surfaces defining at least one pair of toroidal fluid working chambers which in operation have cyclically variable capacity, said assembly including a multiplicity of elements of ceramic material held in assembled and abutted condition by at least one fastener loaded in tension.*
- 298 (Original) *The device of claim 297, including a housing, wherein said housing at least partly encloses said cylinder assembly.*
- 299 (Original) *The device of claim 297, including means between said assembly and said component so as to cause said component to rotate relative to said assembly while reciprocating in said assembly.*
- 300 (Original) *The device of claim 297, wherein said component is at least partly composed of ceramic material.*
- 301 (Original) *The device of claim 297, including at least one second fastener, said reciprocable component comprising a multiplicity of elements, said elements being held in assembled condition by said fastener loaded in tension.*
- 302 (Original) *The device of claim 297, wherein said assembly comprises at least one pair of substantially identical components arranged in mirror image about one another.*

- 303 (Original) The device of claim 297, wherein said component defines a passage for fluids worked by said device.
- 304 (Original) The device of claim 297, including cylinder assembly surfaces and component surfaces at least partly defining said working chambers, at least one of said surfaces having at least one relatively small manufactured depression, said depression wholly fillable by fluids worked by said device.
- 305 (Original) The device of claim 297, wherein said fastener is of tubular form.
- 306 (Original) The device of claim 297, including at least one electrical circuit within said ceramic material.
- 307 (Currently Amended) The device of claim 297, including structure located at least in part outside said cylinder assembly, said structure at least partly defining at least one volume for passage of fluids to or from at least one of said working chambers, (said structure located within said housing and at least partly surrounding at least a portion of said cylinder assembly) said volume at least partly surrounding portion of (being located substantially between said structure and) said cylinder assembly.
- 308 (Currently Amended) The device of claim 297, wherein said device is part of ~~(an)~~ a reciprocating internal combustion engine and said working chambers are combustion chambers, said engine having a charge gas supply system, a fuel delivery apparatus and an emission control system for hot exhaust gas emitted from said engine when operative.
- 309 (Original) The device of claim 298, including means to mount said cylinder assembly in said housing to enable said cylinder assembly to rotate while said component is reciprocating in said cylinder assembly.
- 310 (Original) The device of claim 298, wherein said housing is at least partially composed of thermally insulating material.
- 311 (Original) The device of claim 299, wherein said means comprise a guide and an endless track, said guide movable in said endless track, said track having a multiple wave-form configuration.

- 312 (Original) *The device of claim 299, wherein said means comprise said component and said cylinder assembly define complementary surfaces at least partly of an endless wave-like configuration.*
- 313 (Original) *The device of claim 299, including a rotatable shaft and a load transfer mechanism between said shaft and said rotatable and reciprocable component, wherein said mechanism comprises a hollow shaft with interior splines slidable on a shaft with external splines.*
- 314 (Original) *The device of claim 299, including a rotatable shaft and a load transfer mechanism between said shaft and said component, wherein said mechanism includes a bellows device.*
- 315 (Original) *The device of claim 299, including a rotatable shaft and a load transfer mechanism between said shaft and said component, wherein said mechanism includes at least one hinged element.*
- 316 (Original) *The device of claim 299, including a rotatable shaft and a load transfer mechanism between said shaft and said component, wherein said mechanism includes at least one pair of substantially parallel flanges separated by at least one roller, the flanges in operation moving laterally relatively to one another.*
- 317 (Original) *The device of claim 300, including at least one electrical circuit within said ceramic material.*
- 318 (Original) *The device of claim 301, wherein said second fastener is of tubular form.*
- 319 (Original) *The device of claim 302, including at least one port located in said cylinder assembly for passage of fluid to or from said working chambers, wherein said port is positioned between said pair of components.*
- 320 (Original) *The device of claim 310, wherein said guide is disengagable from said track.*
- 321 (Currently Amended) *A device for the working of fluids comprising a structure, ~~(at least partly enclosing)~~ a cylinder assembly, a component reciprocable within said assembly,*

filamentary material, said component having at least one circumferential projection, said cylinder assembly having at least one circumferential depression in which said projection is positioned to reciprocate, said projection and depression defining a pair of toroidal fluid working chambers of cyclically variable capacity, said structure located at least in part outside said cylinder assembly and at least partly defining a volume for passage of fluids to or from said working chambers, (~~said volume at least partly positioned between said structure and portion of said cylinder assembly,~~) said volume containing said filamentary material and at least partly surrounding portion of said cylinder assembly.

- 322 (Original) *The device of claim 321, including a housing, wherein said housing substantially encloses said structure and said cylinder assembly.*
- 323 (Original) *The device of claim 321, including means between said assembly and said component so as to cause said component to rotate relative to said assembly while reciprocating in said assembly.*
- 324 (Original) *The device of claim 321, wherein at least one of said cylinder assembly and said component is at least partly composed of ceramic material.*
- 325 (Original) *The device of claim 321, including at least one fastener, wherein said cylinder assembly includes a multiplicity of elements held in assembled condition by said at least one fastener loaded under tension.*
- 326 (Original) *The device of claim 321, including at least one fastener, said reciprocable component comprising a multiplicity of elements, said elements being held in assembled condition by said fastener loaded in tension.*
- 327 (Original) *The device of claim 321, wherein said assembly comprises at least one pair of substantially identical components arranged in mirror image about one another.*
- 328 (Original) *The device of claim 321, wherein said component defines a passage for fluids worked by said device.*
- 329 (Currently Amended) *The device of claim 321, including cylinder assembly surfaces and component surfaces at least partly defining said working chambers, at least one of said*

surfaces having at least one relatively small deliberately manufactured depression, said depression wholly fillable by fluids worked by said device.

- 330 (Original) *The device of claim 321, wherein said filamentary material includes substance having catalytic effect to hasten chemical reaction in said working fluid.*
- 331 (Original) *The device of claim 321, wherein said structure is at least partly composed of thermally insulating material.*
- 332 (Currently Amended) *The device of claim ~~(+18)~~ 321, wherein said device is part of ~~(an)~~ a reciprocating internal combustion engine and said working chambers are combustion chambers, said engine having a charge gas supply system, a fuel delivery apparatus and an emission control system for hot exhaust gas emitted from said engine when operative.*
- 333 (Original) *The device of claim 322, including means to mount said cylinder assembly in said housing to enable said cylinder assembly to rotate while said component is reciprocating in said cylinder assembly.*
- 334 (Original) *The device of claim 322, wherein said housing is at least partly of thermally insulating material.*
- 335 (Original) *The device of claim 323, wherein said means comprise a guide and an endless track, said guide movable in said endless track, said track having a multiple wave form configuration.*
- 336 (Original) *The device of claim 323, wherein said means comprise said component and said cylinder assembly define complementary surfaces at least partly of endless wave-like configurations.*
- 337 (Original) *The device of claim 323, including a rotatable shaft and a load transfer mechanism between said shaft and said rotatable and reciprocable component, wherein said mechanism comprises a hollow shaft with interior splines slidable on a shaft with external splines.*
- 338 (Original) *The device of claim 324, including at least one electrical circuit within said*

ceramic material.

339 (Original) *The device of claim 325, wherein said fastener is of tubular form.*

340 (Original) *The device of claim 326, wherein said fastener is of tubular form.*

341 (Original) *The device of claim 327, including at least one port located in said cylinder assembly for passage of fluid to or from said working chambers, wherein said port is positioned between said pair of components.*

342 (Original) *The device of claim 328, including filamentary material contained in said passage, wherein said filamentary material includes substance having catalytic effect to hasten chemical reaction in said working fluid.*

343 (Currently Amended) *The device of claim 335, wherein said guide is disengagable from said track during operation of said device.*

344 (Currently Amended) *The device of any of claims 198, 201, 202, 208; 221, 225, 226, 231; 243(~~-257~~); 277, 280, 286; 297, 308, 310; 321, 324, 332, 334(,) or 339, including a crankshaft and a connecting rod, to which crankshaft said component is mechanically linked at least in part by said connecting rod.*

345 (Currently Amended) *The device of any of claims 198, 201, 202, 208; 221, 225, 226, 231; 243(~~-257~~); 277, 280, 286; 297, 308, 310; 321, 324, 332, 334(,) or 349, said device (~~having an operating cycle and~~) including at least one crankshaft, to which said component is connected by at least one mechanical linkage in normal operation substantially loaded in tension, said linkage transferring loads associated with said working chambers to or from said crankshaft primarily by a pulling action rather than a pushing action.*

346 (Currently Amended) *The device of any of claims 198(~~-199~~), 200, 201, 208; 221(~~-222~~), 223, 224, 231; 279, 280, 286(~~-287~~), 288; 297, 299, 308, (~~-309~~;) 349, 350, 352 or 353, including a first space for transfer of fluid to at least one said working chamber, at least one additional space for transfer of fluid from said working chamber, wherein at least one of said spaces contains filamentary material, said filamentary material including at least some substance*

having catalytic effect to hasten chemical reaction in said fluid.

- 347 (Currently Amended) *The device of any of claims 199, 200, 201; 222, 223, 226; 244, 258, 259; 279, 280, 287, 288; 299, 309, 310; 323, 324, 333(,) or 334, wherein said device is part of an internal combustion engine and at least one said fluid working chamber functions as a combustion chamber, said engine having no purposely designed means for transferring heat from said combustion chamber and being capable of operation for an indefinite period.*
- 348 (Currently Amended) *The device of any of claims 347, wherein said device is part of a compound engine including the engine of claim 347 and a turbine engine, in operation said hot exhaust gas being used to power said turbine engine.*
- 349 (Currently Amended) *A device for processing fluids having at least one cylinder assembly including at least one partly closed end functioning as a cylinder head, a component reciprocable in said cylinder to define at least one working chamber of cyclically varying capacity located between said component, said cylinder and said cylinder head, wherein said device is an un-cooled reciprocating internal combustion engine and said working chamber functions as a combustion chamber, said engine having a charge gas supply system, a fuel delivery apparatus and an (~~hot exhaust gas~~) emission control system for hot exhaust gas emitted from said engine when operative, said engine being free of purposely designed mechanism or construction for transferring heat from said cylinder or said cylinder head and being capable of continuous operation for an indefinite period.*
- 350 (New) *The device of claim 349, wherein at least one of said cylinder, said cylinder head and said component is substantially of ceramic material.*
- 351 (New) *The device of claim 350, including at least one electrical circuit within said ceramic material.*
- 352 (New) *The device of claim 349, including a housing in which said cylinder assembly is mounted, said housing being at least partially composed of thermally insulating material.*
- 353 (New) *The device of claim 349, including at least one fastener, wherein said cylinder assembly includes a multiplicity of elements held in assembled condition by said fastener*

loaded under tension.

- 354 (New) *The device of claim 349, including at least one fastener, wherein said component includes a multiplicity of elements held in assembled condition by said fastener loaded under tension.*
- 355 (New) *The device of claim 349, including cylinder assembly surfaces and component surfaces at least partly defining said working chambers, at least one of said surfaces having at least one relatively small deliberately manufactured depression, said depression wholly fillable by fluids worked by said device.*
- 356 (New) *The device of claim 349, including structure located at least in part outside said cylinder assembly, said structure at least partly defining at least one volume for passage of fluids to or from said working chamber, said volume at least partly surrounding portion of said cylinder assembly.*
- 357 (New) *The device of claim 349, wherein said device is part of a compound engine including the engine of claim 349 and a turbine engine, in operation said hot exhaust gas being used to power said turbine engine.*
- 358 (New) *The device of any of claims 208, 231, 257, 286, 308, 332, 349, 350, 351, 352, 353, 354, 355, 356 and 357, wherein said fuel delivery apparatus includes at least one injector assembly for delivery of at least two distinct fluids independently of one another.*
- 359 (New) *The device of any of claims 208, 231, 257, 274, 275, 276, 286, 308, 332, 349, 350, 351, 352, 353, 354, 355, 356 and 357, wherein said emission control system includes at least one valve for restricting flow of said exhaust gas during selected operating periods of said reciprocating internal combustion engine.*

END OF CLAIMS



RESPONSE 4th April 2007

to Office Communication mailed 5th March 2007

USPTO Application 08 / 477 703 Mitja Hinderks 310 208 6606

CLEAN CLAIMS

What is CLAIMED is:

(1 -197)Claims 1 to 197 are cancelled or renumbered, as noted in the Supplemental Amendment of 25th May 2006.

- 198 *A device for the working of fluids, said device having an integral housing at least partly supporting and substantially enclosing a cylinder assembly comprising a cylinder with at least one circumferential depression, said assembly containing a component with at least one external circumferential projection, said external circumferential projection reciprocable in said internal circumferential depression and both cylinder and component having working surfaces defining at least one pair of toroidal fluid working chambers which in operation have cyclically variable capacity, said housing including insulating material for the purpose of restricting heat transfer from said assembly.*
- 199 *The device of claim 198, including means to mount said cylinder assembly in said housing to enable said cylinder assembly to rotate while said component is reciprocating in said cylinder assembly.*
- 200 *The device of claim 198, including means between said assembly and said component so as to cause said component to rotate relative to said assembly while reciprocating in said assembly.*
- 201 *The device of claim 198, wherein at least one of said cylinder assembly and said component is at least partly composed of ceramic material.*
- 202 *The device of claim 198, including at least one fastener, wherein said cylinder assembly includes a multiplicity of elements held in assembled condition by said fastener loaded under tension.*

- 203 *The device of claim 198, including at least one fastener, said reciprocable component comprising a multiplicity of elements, said elements being held in assembled condition by said fastener loaded in tension.*
- 204 *The device of claim 198, wherein said assembly comprises at least one pair of substantially identical components arranged in mirror image about one another.*
- 205 *The device of claim 198, wherein said component defines a passage for fluids worked by said device.*
- 206 *The device of claim 198, including cylinder assembly surfaces and component surfaces at least partly defining said working chambers, at least one of said surfaces having at least one relatively small deliberately manufactured depression, said depression wholly fillable by fluids worked by said device.*
- 207 *The device of claim 198, including structure located at least in part outside said cylinder assembly, said structure at least partly defining at least one volume for passage of fluids to or from at least one of said working chambers, said volume at least partly surrounding portion of said cylinder assembly.*
- 208 *The device of claim 198, wherein said device is part of a reciprocating internal combustion engine and said working chambers are combustion chambers, said engine having a charge gas supply system, a fuel delivery apparatus and an emission control system for hot exhaust gas emitted from said engine when operative.*
- 209 *The device of claim 200, wherein said means comprise a guide and an endless track, said guide movable in said endless track, said track having a multiple wave-form configuration.*
- 210 *The device of claim 200, wherein said means comprise said component and said cylinder assembly defining complementary surfaces at least partly of an endless wave-like configuration.*
- 211 *The device of claim 200, including a rotatable shaft and a load transfer mechanism between said shaft and said rotatable and reciprocable component, wherein said mechanism comprises a hollow shaft with interior splines slidable on a shaft with external splines.*

- 212 *The device of claim 200, including a rotatable shaft and a load transfer mechanism between said shaft and said component, wherein said mechanism includes a bellows device.*
- 213 *The device of claim 200, including a rotatable shaft and a load transfer mechanism between said shaft and said component, wherein said mechanism includes at least one hinged element.*
- 214 *The device of claim 200, including a rotatable shaft and a load transfer mechanism between said shaft and said component, wherein said mechanism includes at least one pair of substantially parallel flanges separated by at least one roller, the flanges in operation moving laterally relatively to one another.*
- 215 *The device of claim 201, including at least one electrical circuit within said ceramic material.*
- 216 *The device of claim 202, wherein said fastener is of tubular form.*
- 217 *The device of claim 203, wherein said fastener is of tubular form.*
- 218 *The device of claim 204, including at least one port located in said cylinder assembly for passage of fluid to or from said working chambers, wherein said port is positioned between said pair of components.*
- 219 *The device of claim 207, wherein said structure is at least partly of insulating material for the purpose of restricting heat transfer from said volume.*
- 220 *The device of claim 209, wherein said guide is disengagable from said track during operation of said device.*
- 221 *A device for the working of fluids, said device comprising an integral housing at least partly supporting and substantially enclosing a cylinder assembly, said assembly having a cylinder portion and at least one cylinder head portion and a component reciprocally movable within said assembly, said head portion and component defining a variable working chamber therebetween, said component having an internal passage for transfer of fluids to or from said working chamber, said chamber being separated from and pierced by said passage, said housing including insulating material for the purpose of restricting heat transfer from said assembly.*

- 222 *The device of claim 221, including means to mount said cylinder assembly in said housing to enable said cylinder assembly to rotate while said component is reciprocating in said cylinder assembly.*
- 223 *The device of claim 221, including means between said cylinder assembly and said component so as to cause said component to rotate relative to said cylinder while reciprocating in said cylinder assembly.*
- 224 *The device of claim 221 [[55]], wherein said cylinder assembly is substantially made of ceramic material.*
- 225 *The device of claim 221, wherein said component is at least partly composed of ceramic material.*
- 226 *The device of claim 221, including at least one fastener, wherein said cylinder assembly includes a multiplicity of elements held in assembled condition by said at least one fastener loaded under tension.*
- 227 *The device of claim 221, including at least one fastener, said reciprocatable component comprising a multiplicity of elements, said elements being held in assembled condition by said fastener loaded in tension.*
- 228 *The device of claim 221, wherein said assembly comprises at least one pair of substantially identical components arranged in mirror image about one another.*
- 229 *The device of claim 221, including cylinder assembly surfaces and component surfaces at least partly defining said working chambers, at least one of said surfaces having at least one relatively small deliberately manufactured depression, said depression wholly fillable by fluids worked by said device.*
- 230 *The device of claim 221, including structure located at least in part outside said cylinder assembly, said structure at least partly defining at least one volume for passage of fluids to or from at least one of said working chambers, said volume at least partly surrounding portion of said cylinder assembly.*

- 231 *The device of claim 221, wherein said device is part of a reciprocating internal combustion engine and said working chamber is a combustion chamber, said engine having a charge gas supply system, a fuel delivery apparatus and an emission control system for hot exhaust gas emitted from said engine when operative.*
- 232 *The device of claim 223, wherein said means comprise a guide and an endless track, said guide movable in said endless track, said track having a multiple wave-form configuration.*
- 233 *The device of claim 223, wherein said means comprise said component and said cylinder assembly define complementary surfaces at least partly of an endless wave-like configuration.*
- 234 *The device of claim 223, including a rotatable shaft and a load transfer mechanism between said shaft and said rotatable and reciprocable component,, wherein said mechanism comprises a hollow shaft with interior splines slidable on a shaft with external splines.*
- 235 *The device of claim 224, including at least one electrical circuit within said ceramic material.*
- 236 *The device of claim 225, including at least one electrical circuit within said ceramic material.*
- 237 *The device of claim 226, wherein said fastener is of tubular form.*
- 238 *The device of claim 227, wherein said fastener is of tubular form.*
- 239 *The device of claim 228, including at least one port located in said cylinder assembly for passage of fluid to or from said working chamber, wherein said port is positioned between said pair of components.*
- 240 *The device of claim 230, wherein said structure is at least partly of insulating material for the purpose of restricting heat transfer from said volume.*
- 241 *The device of claim 232, wherein said guide is disengagable from said track during operation of said device.*
- 242 *A device for the working of fluids comprising at least one cylinder assembly containing a component reciprocable therein, said component having two longitudinal extremities and at*

least one circumferential projection, said cylinder assembly having at least one internal circumferential depression in which said projection is positioned to reciprocate, said projection and depression forming a pair of toroidal fluid working chambers of cyclically variable capacity, said component having at least one internal passage for movement of fluids to or from said working chambers, said assembly including a multiplicity of elements of ceramic material held in assembled and abutted condition by at least one fastener loaded in tension.

- 243 *The device of claim 242, including a housing in which said cylinder assembly is mounted.*
- 244 *The device of claim 242, including means between said assembly and said component so as to cause said component to rotate relative to said assembly while reciprocating in said assembly.*
- 245 *The device of claim 242, including a crankshaft and a connecting rod, to which crankshaft an extremity is linked by said connecting rod.*
- 246 *The device of claim 242, wherein at least one of said extremities in normal operation transfers loads associated with said working chambers, said loads in operation being principally in tension.*
- 247 *The device of claim 242, wherein said component is at least partly composed of ceramic material.*
- 248 *The device of claim 242, wherein said assembly comprises at least one pair of substantially identical components arranged in mirror image about one another.*
- 249 *The device of claim 242, including at least one second fastener, said reciprocable component comprising a multiplicity of elements, said elements being held in assembled condition by said second fastener loaded in tension.*
- 250 *The device of claim 242, including filamentary material contained in said internal passage.*
- 251 *The device of claim 242, wherein said component has at least one surface at least partly defining said working chambers, said surface having at least one relatively small*

manufactured depression wholly fillable by fluids worked by said device.

- 252 *The device of claim 242, wherein said cylinder assembly has at least one surface at least partly defining said working chambers, said surface having at least one relatively small manufactured depressions wholly fillable by fluids worked by said device.*
- 253 *The device of claim 242, wherein said fastener is of tubular form.*
- 254 *The device of claim 242, including at least one electrical circuit within said ceramic material.*
- 255 *The device of claim 242, including a rotatable shaft and a load transfer mechanism, said component being linked to said rotatable shaft by said load transfer mechanism.*
- 256 *The device of claim 242, including structure located at least in part outside said cylinder assembly, said structure at least partly defining at least one volume for passage of fluids to or from at least one of said working chambers, said volume at least partly surrounding portion of said cylinder assembly.*
- 257 *The device of claim 242, wherein said device is part of a reciprocating internal combustion engine and said working chambers are combustion chambers, said engine having a charge gas supply system, a fuel delivery apparatus and an emission control system for hot exhaust gas emitted from said engine when operative.*
- 258 *The device of claim 243, wherein said housing is at least partially composed of thermally insulating material.*
- 259 *The device of claim 243, including means to mount said cylinder assembly in said housing to enable said cylinder assembly to rotate while said component is reciprocating in said cylinder assembly.*
- 260 *The device of claim 244, wherein said means comprise a guide and an endless track, said guide movable in said endless track, said track having a multiple wave form configuration.*
- 261 *The device of claim 244, wherein said means comprise said component and said cylinder assembly define complementary surfaces at least partly of endless wave-like configurations.*

- 262 *The device of claim 247, including at least one electrical circuit within said ceramic material.*
- 263 *The device of claim 248, wherein said pair of components define a port therebetween for passage of fluid to or from said working chambers.*
- 264 *The device of claim 249, wherein said second fastener is of tubular form.*
- 265 *The device of claim 250, wherein said filamentary material includes substance having catalytic effect to hasten chemical reaction in said working fluid.*
- 266 *The device of claim 255, wherein said mechanism comprises a hollow shaft with interior splines slidable on a shaft with external splines.*
- 267 *The device of claim 255, wherein said mechanism comprises a bellows device.*
- 268 *The device of claim 255, wherein said mechanism includes at least one hinged element.*
- 269 *The device of claim 255, wherein said mechanism includes at least one pair of substantially parallel flanges separated by at least one roller, the flanges in operation moving laterally relatively to one another.*
- 270 *The device of claim 256, including filamentary material contained in said volume.*
- 271 *The device of claim 257, wherein said device is part of a compound engine including said internal combustion engine and a second engine.*
- 272 *The device of claim 260, wherein said guide is disengagable from said track.*
- 273 *The device of claim 270, wherein said filamentary material includes substance having catalytic effect to hasten chemical reaction in said working fluid.*
- 274 *The device of claim 271, wherein said second engine is a turbine engine, in operation said hot exhaust gas being used to power said turbine engine.*
- 275 *The device of claim 271, wherein said second engine is a steam engine, in operation energy*

from said hot exhaust gas being used to power said steam engine.

276 *The device of claim 271, wherein said second engine is a Stirling engine, in operation energy from said hot exhaust gas being used to power said Stirling engine.*

277 *A device for the working of fluids comprising an integral structure, a cylinder assembly having at least one circumferential depression and mounted in and at least partly surrounded by said structure and containing a component reciprocable in said assembly, said component having two cylindrical ends each with at least one opening and at least one circumferential projection reciprocable in said circumferential depression in said assembly to form at least one pair of toroidal fluid working chambers of cyclically variable capacity, said component having at least one internal passage for transfer of fluids to or from said working chambers, said structure at least partially surrounding portion of said cylinder assembly and including insulating material to restrict heat transfer from said assembly, in operation said openings permitting transfer of fluid between said passage and said working chambers.*

278 *The device of claim 277, including a housing which substantially encloses said structure and said cylinder assembly.*

279 *The device of claim 277, including means between said assembly and said component so as to cause said component to rotate relative to said assembly while reciprocating in said assembly.*

280 *The device of claim 277, wherein at least one of said cylinder assembly and said component is at least partly composed of ceramic material.*

281 *The device of claim 277, including at least one fastener, wherein said cylinder assembly includes a multiplicity of elements held in assembled condition by said at least one fastener loaded under tension.*

282 *The device of claim 277, including at least one fastener, said reciprocable component comprising a multiplicity of elements, said elements being held in assembled condition by said fastener loaded in tension.*

- 283 *The device of claim 277, wherein said assembly comprises at least one pair of substantially identical components arranged in mirror image about one another.*
- 284 *The device of claim 277, including cylinder assembly surfaces and component surfaces at least partly defining said working chambers, at least one of said surfaces having at least one relatively small deliberately manufactured depression, said depression wholly fillable by fluids worked by said device.*
- 285 *(Currently Amended) The device of claim 277, including at least one volume for passage of fluids to or from at least one of said working chambers, said volume being located substantially between said structure and said cylinder assembly, said volume at least partly surrounding portion of said cylinder assembly.*
- 286 *The device of claim 277, wherein said device is part of a reciprocating internal combustion engine and said working chambers are combustion chambers, said engine having a charge gas supply system, a fuel delivery apparatus and an emission control system for hot exhaust gas emitted from said engine when operative.*
- 287 *The device of claim 278, including means to mount said cylinder assembly in said housing to enable said cylinder assembly to rotate while said component is reciprocating in said cylinder assembly.*
- 288 *The device of claim 278, wherein said housing is at least partially composed of thermally insulating material.*
- 289 *The device of claim 279, wherein said means comprise a guide and an endless track, said guide movable in said endless track, said track having a multiple wave form configuration.*
- 290 *The device of claim 279, wherein said means comprise said component and said cylinder assembly define complementary surfaces at least partly of endless wave-like configurations.*
- 291 *The device of claim 279, including a rotatable shaft and a load transfer mechanism between said shaft and said rotatable and reciprocable component, wherein said mechanism comprises a hollow shaft with interior splines slidable on a shaft with external splines.*

- 292 *The device of claim 280, including at least one electrical circuit within said ceramic material.*
- 293 *The device of claim 281, wherein said fastener is of tubular form.*
- 294 *The device of claim 282, wherein said fastener is of tubular form.*
- 295 *The device of claim 283, including at least one port located in said cylinder assembly for passage of fluid to or from said working chambers, wherein said port is positioned between said pair of components.*
- 296 *The device of claim 289, wherein said guide is disengagable from said track during operation of said device.*
- 297 *A device for the working of fluids, said device having a cylinder assembly comprising a cylinder with at least one internal circumferential depression, said assembly containing a component with at least one external circumferential projection, said external circumferential projection reciprocating in said circumferential depression and both having working surfaces defining at least one pair of toroidal fluid working chambers which in operation have cyclically variable capacity, said assembly including a multiplicity of elements of ceramic material held in assembled and abutted condition by at least one fastener loaded in tension.*
- 298 *The device of claim 297, including a housing, wherein said housing at least partly encloses said cylinder assembly.*
- 299 *The device of claim 297, including means between said assembly and said component so as to cause said component to rotate relative to said assembly while reciprocating in said assembly.*
- 300 *The device of claim 297, wherein said component is at least partly composed of ceramic material.*
- 301 *The device of claim 297, including at least one second fastener, said reciprocatable component comprising a multiplicity of elements, said elements being held in assembled condition by said fastener loaded in tension.*

- 302 *The device of claim 297, wherein said assembly comprises at least one pair of substantially identical components arranged in mirror image about one another.*
- 303 *The device of claim 297, wherein said component defines a passage for fluids worked by said device.*
- 304 *The device of claim 297, including cylinder assembly surfaces and component surfaces at least partly defining said working chambers, at least one of said surfaces having at least one relatively small manufactured depression, said depression wholly fillable by fluids worked by said device.*
- 305 *The device of claim 297, wherein said fastener is of tubular form.*
- 306 *The device of claim 297, including at least one electrical circuit within said ceramic material.*
- 307 *The device of claim 297, including structure located at least in part outside said cylinder assembly, said structure at least partly defining at least one volume for passage of fluids to or from at least one of said working chambers, said volume at least partly surrounding portion of said cylinder assembly.*
- 308 *The device of claim 297, wherein said device is part of a reciprocating internal combustion engine and said working chambers are combustion chambers, said engine having a charge gas supply system, a fuel delivery apparatus and an emission control system for hot exhaust gas emitted from said engine when operative.*
- 309 *The device of claim 298, including means to mount said cylinder assembly in said housing to enable said cylinder assembly to rotate while said component is reciprocating in said cylinder assembly.*
- 310 *The device of claim 298, wherein said housing is at least partially composed of thermally insulating material.*
- 311 *The device of claim 299, wherein said means comprise a guide and an endless track, said guide movable in said endless track, said track having a multiple wave-form configuration.*

- 312 *The device of claim 299, wherein said means comprise said component and said cylinder assembly define complementary surfaces at least partly of an endless wave-like configuration.*
- 313 *The device of claim 299, including a rotatable shaft and a load transfer mechanism between said shaft and said rotatable and reciprocable component, wherein said mechanism comprises a hollow shaft with interior splines slidable on a shaft with external splines.*
- 314 *The device of claim 299, including a rotatable shaft and a load transfer mechanism between said shaft and said component, wherein said mechanism includes a bellows device.*
- 315 *The device of claim 299, including a rotatable shaft and a load transfer mechanism between said shaft and said component, wherein said mechanism includes at least one hinged element.*
- 316 *The device of claim 299, including a rotatable shaft and a load transfer mechanism between said shaft and said component, wherein said mechanism includes at least one pair of substantially parallel flanges separated by at least one roller, the flanges in operation moving laterally relatively to one another.*
- 317 *The device of claim 300, including at least one electrical circuit within said ceramic material.*
- 318 *The device of claim 301, wherein said second fastener is of tubular form.*
- 319 *The device of claim 302, including at least one port located in said cylinder assembly for passage of fluid to or from said working chambers, wherein said port is positioned between said pair of components.*
- 320 *The device of claim 310, wherein said guide is disengagable from said track.*
- 321 *A device for the working of fluids comprising a structure, a cylinder assembly, a component reciprocable within said assembly, filamentary material, said component having at least one circumferential projection, said cylinder assembly having at least one circumferential depression in which said projection is positioned to reciprocate, said projection and depression defining a pair of toroidal fluid working chambers of cyclically variable capacity, said structure located at least in part outside said cylinder assembly and at least partly defining a volume for passage of fluids to or from said working chambers, said volume*

containing said filamentary material and at least partly surrounding portion of said cylinder assembly.

- 322 *The device of claim 321, including a housing, wherein said housing substantially encloses said structure and said cylinder assembly.*
- 323 *The device of claim 321, including means between said assembly and said component so as to cause said component to rotate relative to said assembly while reciprocating in said assembly.*
- 324 *The device of claim 321, wherein at least one of said cylinder assembly and said component is at least partly composed of ceramic material.*
- 325 *The device of claim 321, including at least one fastener, wherein said cylinder assembly includes a multiplicity of elements held in assembled condition by said at least one fastener loaded under tension.*
- 326 *The device of claim 321, including at least one fastener, said reciprocable component comprising a multiplicity of elements, said elements being held in assembled condition by said fastener loaded in tension.*
- 327 *The device of claim 321, wherein said assembly comprises at least one pair of substantially identical components arranged in mirror image about one another.*
- 328 *The device of claim 321, wherein said component defines a passage for fluids worked by said device.*
- 329 *The device of claim 321, including cylinder assembly surfaces and component surfaces at least partly defining said working chambers, at least one of said surfaces having at least one relatively small deliberately manufactured depression, said depression wholly fillable by fluids worked by said device.*
- 330 *The device of claim 321, wherein said filamentary material includes substance having catalytic effect to hasten chemical reaction in said working fluid.*

- 331 *The device of claim 321, wherein said structure is at least partly composed of thermally insulating material.*
- 332 *The device of claim 321, wherein said device is part of a reciprocating internal combustion engine and said working chambers are combustion chambers, said engine having a charge gas supply system, a fuel delivery apparatus and an emission control system for hot exhaust gas emitted from said engine when operative.*
- 333 *The device of claim 322, including means to mount said cylinder assembly in said housing to enable said cylinder assembly to rotate while said component is reciprocating in said cylinder assembly.*
- 334 *The device of claim 322, wherein said housing is at least partly of thermally insulating material.*
- 335 *The device of claim 323, wherein said means comprise a guide and an endless track, said guide movable in said endless track, said track having a multiple wave form configuration.*
- 336 *The device of claim 323, wherein said means comprise said component and said cylinder assembly define complementary surfaces at least partly of endless wave-like configurations.*
- 337 *The device of claim 323, including a rotatable shaft and a load transfer mechanism between said shaft and said rotatable and reciprocable component, wherein said mechanism comprises a hollow shaft with interior splines slidable on a shaft with external splines.*
- 338 *The device of claim 324, including at least one electrical circuit within said ceramic material.*
- 339 *The device of claim 325, wherein said fastener is of tubular form.*
- 340 *The device of claim 326, wherein said fastener is of tubular form.*
- 341 *The device of claim 327, including at least one port located in said cylinder assembly for passage of fluid to or from said working chambers, wherein said port is positioned between said pair of components.*

- 342 *The device of claim 328, including filamentary material contained in said passage, wherein said filamentary material includes substance having catalytic effect to hasten chemical reaction in said working fluid.*
- 343 *The device of claim 335, wherein said guide is disengagable from said track during operation of said device.*
- 344 *The device of any of claims 198, 201, 202, 208; 221, 225, 226, 231; 243; 277, 280, 286; 297, 308, 310; 321, 324, 332, 334 or 339, including a crankshaft and a connecting rod, to which crankshaft said component is mechanically linked at least in part by said connecting rod.*
- 345 *The device of any of claims 198, 201, 202, 208; 221, 225, 226, 231; 243(; 277, 280, 286; 297, 308, 310; 321, 324, 332, 334 or 349, said device including at least one crankshaft, to which said component is connected by at least one mechanical linkage in normal operation substantially loaded in tension, said linkage transferring loads associated with said working chambers to or from said crankshaft primarily by a pulling action rather than a pushing action.*
- 346 *The device of any of claims 198, 200, 201, 208; 221, 223, 224, 231; 279, 280, 286, 288; 297, 299, 308, 349, 350, 352 or 353, including a first space for transfer of fluid to at least one said working chamber, at least one additional space for transfer of fluid from said working chamber, wherein at least one of said spaces contains filamentary material, said filamentary material including at least some substance having catalytic effect to hasten chemical reaction in said fluid.*
- 347 *The device of any of claims 199, 200, 201; 222, 223, 226; 244, 258, 259; 279, 280, 287, 288; 299, 309, 310; 323, 324, 333 or 334, wherein said device is part of an internal combustion engine and at least one said fluid working chamber functions as a combustion chamber, said engine having no purposely designed means for transferring heat from said combustion chamber and being capable of operation for an indefinite period.*
- 348 *The device of any of claims 347, wherein said device is part of a compound engine including the engine of claim 347 and a turbine engine, in operation said hot exhaust gas being used to power said turbine engine.*

- 349 *A device for processing fluids having at least one cylinder assembly including at least one partly closed end functioning as a cylinder head, a component reciprocable in said cylinder to define at least one working chamber of cyclically varying capacity located between said component, said cylinder and said cylinder head, wherein said device is an un-cooled reciprocating internal combustion engine and said working chamber functions as a combustion chamber, said engine having a charge gas supply system, a fuel delivery apparatus and an emission control system for hot exhaust gas emitted from said engine when operative, said engine being free of purposely designed mechanism or construction for transferring heat from said cylinder or said cylinder head and being capable of continuous operation for an indefinite period.*
- 350 *The device of claim 349, wherein at least one of said cylinder, said cylinder head and said component is substantially of ceramic material.*
- 351 *The device of claim 350, including at least one electrical circuit within said ceramic material.*
- 352 *The device of claim 349, including a housing in which said cylinder assembly is mounted, said housing being at least partially composed of thermally insulating material.*
- 353 *The device of claim 349, including at least one fastener, wherein said cylinder assembly includes a multiplicity of elements held in assembled condition by said fastener loaded under tension.*
- 354 *The device of claim 349, including at least one fastener, wherein said component includes a multiplicity of elements held in assembled condition by said fastener loaded under tension.*
- 355 *The device of claim 349, including cylinder assembly surfaces and component surfaces at least partly defining said working chambers, at least one of said surfaces having at least one relatively small deliberately manufactured depression, said depression wholly fillable by fluids worked by said device.*
- 356 *The device of claim 349, including structure located at least in part outside said cylinder assembly, said structure at least partly defining at least one volume for passage of fluids to or from said working chamber, said volume at least partly surrounding portion of said cylinder*

assembly.

- 357 *The device of claim 349, wherein said device is part of a compound engine including the engine of claim 349 and a turbine engine, in operation said hot exhaust gas being used to power said turbine engine.*
- 358 *The device of any of claims 208, 231, 257, 286, 308, 332, 349, 350, 351, 352, 353, 354, 355, 356 and 357, wherein said fuel delivery apparatus includes at least one injector assembly for delivery of at least two distinct fluids independently of one another.*
- 359 *The device of any of claims 208, 231, 257, 274, 275, 276, 286, 308, 332, 349, 350, 351, 352, 353, 354, 355, 356 and 357, wherein said emission control system includes at least one valve for restricting flow of said exhaust gas during selected operating periods of said reciprocating internal combustion engine.*

END OF CLAIMS



4-5-07

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16W 3747 #

Commissioner for Patents

Reference the Application of Mitja Hinderks:

Serial No **08 / 477 703**
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Examiner N Kamen
New Title FLUID TRANSFER IN RECIPROCATING DEVICES

4th April 2007

COVER LETTER & CERTIFICATE OF MAILING UNDER 37 CFR 1.8

I hereby certify that the correspondence itemized below is being deposited with the United States Postal Service today with sufficient postage as first class mail in a package addressed to:

Commissioner for Patents
P O Box 1450
Alexandria VA 22313 - 1450

The following documents relating to the above patent application are herewith enclosed:

- 1 This Certificate of Mailing (1 page);
- 2 Response to Office Communication & Supplemental Amendment (2 pages);
- 3 Corrected Title Page of amended text as submitted 12th February 2007 (1 page);
- 4 Annotated Copy of All Claims, as corrected and amended (19 pages);
- 5 Clean Copy of All Claims, as corrected and amended (18 pages).

In the Supplemental Amendment, two new multiple dependent claims were added. Please debit my patent Office Account deposit account number **501 334** the appropriate small entity fee, which I believe is a total of \$ 360 (\$ 180 per claim).

Sincerely,

Mitja Victor Hinderks.

Sole inventor, applicant and power-of-attorney of record.